

CLAIMS

I claim:

1 1. A method for the reduction of load cycle oscillations in the drive train of a
2 motor vehicle, the method comprising:

3 detecting a change in an available torque in the drive train of a motor vehicle, said
4 change causing a load cycle oscillation having a period,

5 determining the period of the load cycle oscillation, and

6 at the commencement of the change in available torque, applying at least one
7 torque pulse which causes an oscillation in phase opposition to the load cycle oscillation, said
8 torque pulse having a duration which is about half the period of the load cycle oscillation.

1 2. A method as in claim 1 further comprising detecting the magnitude of the
2 available torque, said torque pulse having a magnitude which is about half the magnitude of the
3 available torque.

1 3. A method as in claim 1 wherein said torque pulse is triggered by a logic
2 device.

1 4. A method as in claim 1 wherein said torque pulse is applied by an electric
2 motor.

1 5. A method as in claim 1 wherein said torque pulse is applied by a starter
2 motor of the vehicle.

1 6. A method as in claim 1 wherein said torque pulse is applied by a rotating
2 mass via a brake.

1 7. A method as in claim 1 wherein said torque pulse is controlled by torque
2 information from engine electronics.

1 8. A method as in claim 1 further comprising determining a change in
2 rotational speed, and deriving control of the torque pulse from the change in rotational speed.

1 9. A method as in claim 1 wherein said torque pulse is applied to the engine
2 of the motor vehicle.

1 10. A method as in claim 1 wherein said drive train comprises a flywheel
2 having a primary part and a secondary part, said torque pulse being applied to one of said
3 primary part and said secondary part.

1 11. A method as in claim 1 comprising applying a first torque pulse having a
2 negative value with respect to said available torque, and applying a second torque pulse having a
3 positive value with respect to said available torque.

1 12. A method as in claim 1 wherein said torque pulse commences at the time
2 of synchronization during one of a gear change and starting the engine.

1 13. A method as in claim 1 wherein said torque pulse commences during one
2 of a first rise in available torque and an engine torque in opposition to said available torque.

1 14. A method as in claim 1 comprising a first torque pulse and a second torque
2 pulse, said second torque pulse commencing one period later than commencing the first torque
3 pulse.

1 15. A method as in claim 1 comprising providing first, second, and third
2 torque pulses in succession, said second torque pulse directed opposite to said first and third
3 torque pulses.

1 16. An apparatus for the reduction of load cycle oscillations in the drive train
2 of a motor vehicle, the apparatus comprising:

3 means for detecting a change in an available torque in the drive train of a motor
4 vehicle, said change causing a load cycle oscillation having a period,

5 means for determining the period of the load cycle oscillation,

6 means for generating a torque pulse coupled to the drive train, and

7 logic means for triggering the torque pulse at the commencing of a load cycle
8 oscillation, said logic means controlling said torque pulse so that it lasts half the period of the
9 load cycle oscillation and is in phase opposition to the load cycle oscillation.

1 17. An apparatus as in claim 16 wherein said means for generating a torque
2 pulse is an electric motor which is coupled to an internal combustion engine.

1 18. An apparatus as in claim 16 wherein said drive train comprises a flywheel
2 having a primary part and a secondary part, said means for generating a torque pulse being
3 coupled to one of said primary part and said secondary part.

1 19. A control program for the reduction of load cycle oscillations in the drive
2 train of a motor vehicle, the program comprising the following program steps:

3 detecting a change in an available torque in the drive train of a motor vehicle, said
4 change causing a load cycle oscillation having a period,

5 determining the period of the load cycle oscillation, and

6 generating a control signal for generating a torque pulse having a duration which
7 is about half the period of the load cycle oscillation and is in phase opposition to the load cycle
8 oscillation.

1 20. A control program as in claim 19 wherein said program is stored on a data
2 carrier.

1 21. A control apparatus for the reduction of load cycle oscillations in the drive
2 train of a motor vehicle, said control apparatus having a control program with a program code for
3 carrying out the following steps:

4 detecting a change in an available torque in the drive train of a motor vehicle, said
5 change causing a load cycle oscillation having a period,

6 determining the period of the load cycle oscillation, and

7 at the commencement of the change in available torque, applying at least one
8 torque pulse which causes an oscillation in phase opposition to the load cycle oscillation, said
9 torque pulse having a duration which is about half the period of the load cycle oscillation.